

CLAIMS

1. An apparatus for forming a plug in a passageway, the apparatus comprising a carrier which in use is lowered into the passageway, the carrier comprising an elongate body of a material resistant to creep which supports at least two spaced apart portions that are a sliding fit in the passageway such that a gap is formed between each of the portions and the passageway, a body of material the melting point of which is higher than the temperature within the passageway and which expands as it solidifies, the body of material being supported on the carrier, and means for melting the body of material such that melted material fills a space defined between the first and second portions, wherein means are provided to obstruct the gaps formed between the portions and the passageway, the obstructing means being displaced into the gaps as a result of melting of the body of material or as a result of creep of material after it has been melted and solidified.
2. An apparatus according to claim 1, wherein the obstructing means comprise rings housed in grooves in the spaced apart portions, the rings being displaced into the gaps as a result of melting of the body of material.
3. An apparatus according to claim 2, wherein at least one ring comprises overlapping coils.
4. An apparatus according to claim 2, wherein each ring is C-shaped.
5. An apparatus according to claim 2, 3 or 4 wherein each ring is formed from a memory metal which causes the ring to expand when the ring is heated as a result of melting of the body of material.

6. An apparatus according to claim 2, 3 or 4, wherein each ring is initially secured in the groove and released as a result of melting of the body of material, the ring being sprung so as to move outward relative to the groove when released.
7. An apparatus according to claim 2, 3 or 4, wherein each ring is formed at least in part from a bimetallic strip which when heated as a result of melting of the body of material causes the ring to move outwards relative to the groove.
8. An apparatus according to claim 1, wherein the obstructing means comprise components which are arranged so as to float or sink into the gaps when the material is melted.
9. An apparatus according to claim 8, wherein the components are particulates which are larger than the gaps, the particulates being free to move within the melted material.
10. An apparatus according to claim 9, wherein the particulates are magnetic beads the magnetisation of which is such that the beads migrate to the gaps when the material is melted.
11. An apparatus according to claim 8, wherein the components are coupled to the carrier body so as to be moveable along predetermined paths relative to the body and shaped to obstruct portions of the gaps.
12. An apparatus according to claim 1, wherein the obstructing means comprise skirts extending from the spaced apart portions into the space therebetween such that the skirts are embedded in solidified material after the plug is formed and are positioned such that any creep of the solidified material deflects the skirts outwards to obstruct the gaps.

13. An apparatus according to any preceding claim, wherein the spaced apart portions are defined by fins extending radially outwards from the elongate body.
14. An apparatus according to any preceding claim, wherein the elongate body is tubular.
15. An apparatus according to claim 14, wherein the tubular body receives a heater element.
16. An apparatus according to any preceding claim, wherein the passageway is a well.
17. An apparatus according to any one of claims 1 to 15, wherein an object is fixedly attached to the carrier, such that after solidification of the material, the object is fixedly attached to the passage way.
18. An apparatus according to any preceding claim, comprising heating means for melting the solidified material, thereby allowing the carrier to be removed from the passageway.
19. A method for forming a plug in a passageway, wherein a carrier is placed in the passageway, the carrier defining an elongate body of material resistant to creep which supports at least two spaced apart portions that are a sliding fit in the passage way such that a gap is formed between each of the portions and passageway, a body of material the melting point of which is higher than the temperature within the passageway and which expands as it solidifies is melted in the passageway to fill a space defined between the spaced apart portions, and the carrier is cooled such that molten material adjacent the spaced apart portions solidifies before molten material between the spaced apart portions.

20. A method according to claim 19, wherein the carrier comprises an elongate tubular body from which the spaced apart portions project, and the carrier is cooled by introducing coolant into the tubular body.
21. A method according to claim 20, wherein the coolant is water above the plug in the passageway.
22. A method according to claim 19, 20 or 21, wherein the passageway is a well.
23. An apparatus substantially as hereinbefore described with reference to figures 9 to 23 of the accompanying drawings.
24. A method substantially as hereinbefore described with reference to figures 8 to 10, and 20 to 23 of the accompanying drawings.